FUJI ELECTRIC

PAPERLESS RECORDER

DATA SHEET PHR

This is a paperless recorder that displays measured data on the LCD in real time and stores data in CompactFlash.

The type of input such as thermocouple, resistance bulb, D.C. voltage (current), etc. can be arbitrarily set to 18 channels at the maximum.

The data stored in CompactFlash can be regenerated on the screen, and the use of supplied support software allows the data to be regenerated on a PC screen.

The data recorded in ASCII format can be directly read in a spreadsheet such as Excel, which facilitates the processing on a PC. (The data recorded in binary format cannot be read in.)

FEATURES

1. Large capacity storage by CompactFlash
   Measured data is periodically stored in CompactFlash. Large storage capacity of up to 256MB allows display files for approximately one and a half years to be recorded continuously at the display refresh cycle of 30 seconds (in the case of ASCII data format, 9 channels).
2. Quick search and display of past data
   Data stored in CompactFlash can be displayed in succession by scrolling the screen.
3. Various display capability
   Depending on the object of measurement, the most suitable display format can be selected from a variety of formats including bar graph display, trend display, digital display, etc.
4. PC support software supplied as standard
   Loader software that enables easy display and change of set data and data viewer software that regenerates the data stored in CompactFlash are supplied as standard.
5. Compact size
   160 (W) × 144 (H) × 185 (D) mm(Panel mounting), 1.5kg compact size
6. 18-point recording (Option)
   12 types of thermocouples, 2 types of resistance bulbs and DC voltage/current input can be recorded up to 18 points.

SPECIFICATIONS

Input system

Number of input points:9 points or 18 points (Can be selected at the time of purchase)

Input circuit: Input mutual isolation
Resistance bulb measured current: about. 1 mA

Measuring cycles:9 or 18 points....100ms cycles

Input types: Thermocouple, resistance bulb, DC voltage, and DC current (Shunt resistors are fitted in input terminals).
Note) Provide a shunt resistor (type: PHZP0101) separately.

Measuring range

Input types		Reference range
Thermocouple	B	400.0 to 1760.0°C
	R	0.0 to 1760.0°C
	S	0.0 to 1760.0°C
	K	–200.0 to 1370.0°C
	E	–200.0 to 800.0°C
	J	–200.0 to 1100.0°C
	T	–200.0 to 400.0°C
	N	0.0 to 1300.0°C
	W	0.0 to 1760.0°C
	L	–200.0 to 900.0°C
	U	–200.0 to 400.0°C
	PN	0.0 to 1300.0°C
Resistance bulb	JPt100	–200.0 to 600.0°C
	Pt100	–200.0 to 600.0°C
DC voltage	50mV	0.00 to 50.00mV
	500mV	0.0 to 500.0mV
	1-5V	1.000 to 5.000V
	0-5V	0.000 to 5.000V

Note) B, R, S, K, E, J, T, N : JIS C 1602, DIN IEC 584-1
W : 5%Re-26%Re · W (Hoskins Mfg. Co. USA)
L : Fe-Cu · Ni (DIN 43710)
U : Cu-Cu · Ni (DIN 43710)
PN: Platinum
JPt100 : JIS C 1604-1989 (Old JIS Pt 100)
Pt100 : JIS 1604, DIN IEC 751

Selection of input types:
By key operation on the front panel. Note that the same input type (thermocouple, resistance bulb, voltage) should be set every 2 channels. Refer to "Setting method of input types" for details.

Burn-out function:
Equipped in thermocouple and resistance bulb inputs as standard, and overswings the recording to 100% side.
Thermocouple burn-out current: approx. 0.2 μA

Input filter function:
Settable for each channel (primary delay filter)
Time constants are settable in the range from 0 to 900 sec.

Scaling function: Possible by DC voltage (current) input
Scaling range: -32767 to 32767
Decimal position: settable at any point
Unit symbol: settable up to 7 digits and 12 types

Subtraction function:
Subtraction between each channel is allowed.

Totalizing function:
The measured value of each channel can be totalized. The base time can be selected from Day, Hour, Minute, and Second.

F value calculation function:
F value (extinction value of bacteria by sterilization by heating) can be calculated from the measured temperature by each channel.

Square rooter function:
Square rooter can be performed against the input value per each channel.

Indication system

Indicator: 5.7" TFT color LCD (320 x 240 dots) with backlight, no contrast adjustment

Color of indication:
14 colors

Applicable language:
English

Life of backlight: 50,000 hours
(the complete indicator unit should be replaced when replacing backlight).

Trend display: Direction: vertical and horizontal
Number of channels: 10 channels for the group on one screen (Input:18 points at the maximum).
Display refreshment cycles: select from 1 second to 12 hours
No numerical value display. Scale display/no-display can be selected.

Bar graph display:
Number. of channels: 10 channels for the group on one screen (Input:18 points at the maximum).
Display refreshment cycles: 1 second.

Analog meter display:
Display for up to 4 inputs per group (input from 1 to 4). Display in bar graphs or in analog meters can be selected.
Display refresh cycle: 1 second

Digital display: Number of channels: 10 channels for the group on one screen (Input:18 points at the maximum).
Display refreshment cycles: 1 second.

Totalizing data display:
Number of channels: 10 channels for the group on one screen (Input: 18 points at the maximum)
Display refresh cycle: 1 second.

Event summary display:
Alarm summary and message summary can be displayed. The message occurrence information and message display can be switched.

Parameter display/set:
Already-set Data Display and Set Change Display screen

TAG indication: Number. of characters to be displayed: Up to 8 characters
Characters to be displayed: Alphanumerical characters

Historical trend display:
The past data can be displayed from the compact flash. The past data file can be read and displayed. With scroll display function, Scale display/no-display can be selected.

Number of screen groups:
Four groups (Up to 10 channels per 1 group can be registered.)

Keyboard

No. of Keys: 8

Function: Use to select various screens and set various parameters.

Recording function

External memory media:
Compact Flash card

Recording capacity:
A max. of 256 MB (Compact Flash card)

Recording method:
Turning ON the REC key allows measured data to be written at fixed cycles.
Recorded as a new file whenever the recording starts

Data save cycles:
Linked to the display refreshment cycles on the "Real Time Trend" screen. However, they are automatically set to about 1 minute if the refreshment cycles are set to less than 1 minute.

Trend data: Min. and max. measured values out of measured data that are sampled at the measuring cycles are saved.

Event data: Saves alarm data and message data.

Totalizing value data:
Totalizing value data at designated timing is recorded per channel.
Totalized value data at designated totalized value recording cycle (and not the sum total) is recorded in the totalizing file.
If a power failure occurs during totalization and then the power is restored, the data being totalized is cleared.

Storage capacity:
Approximately 1.5 years when the display refresh cycle is 30 seconds (in the case of 9-channel recording in ASCII data format, and 256MB compact flash is used). Refer to Table 1.

Residual capacity of memory:
Indicates how much of the memory card has been used on the screen. If the residual capacity is none, the recording stops.

Recommended card :
SanDisk
URL: http://www.sandisk.co.jp
Type: SDCFB-256-801 (256MB)
Available at any PC shops

Recommended PC card adaptor:
SanDisk Corp. SDCF-31-03

Data format: Either of ASCII or binary format can be selected. (Switching cannot be made while the recording is in progress. In the case of ASCII format, the data can be directly read on Excel, etc.)
Note: The data recorded in binary format cannot be read directly.
Approximately 166 bytes per 1 sampling (for 9-channel input in ASCII format) or approximately 45 bytes (for 9-channel input in binary format)

Alarm function

No. of settings: Up to 4 alarms for each channel are settable.

Type of alarm: High/Low limits

Indication: Status (alarm types) is displayed on digital display unit when an alarm occurs.
History display on alarm summary (Alarm start/cancel time and alarm types)

Hysteresis: Set within the recording range of 0 to 100%

Relay output: Number of points; 10 (option: Cannot be selected if the number of input points is 18.)

Alarm latch function:
Holds alarm indication and alarm output after alarm reset.
ON/OFF operation is performed according to key setting.

Power supply

Rated power voltage:
100 to 240V AC

Range of operating voltage:
90 to 264V AC

Supply frequency:
50/60Hz (both employable)

Power voltage

Power voltage	No option
100V AC	About 32VA
200V AC	About 42VA

Structure

Mounting method:
Panel-mounted (vertical panel) or portable (desktop type)

Mounting posture:
Rearward tilt within 0 to 30° horizontal 0°

Thickness of panel:
2 to 26 mm

Materials: PC-ABS for case and bezel

Color: Black

External dimensions:
Panel-mounted: 160 (W) × 144 (H) × 185 (D) mm
Portable: 160 (W) × 179 (H) × 206.6 (D) mm

Mass: About 1.5 kg (no option)

External terminal board:
Screw terminals (M3 thread)

Normal operating condition

Power voltage: 90 to 264V AC

Supply frequency:
50/60 Hz ±2% (both employable)

Ambient temperature:
Panel-mounted: 0 to 50°C
Portable: 0 to 40°C

Ambient humidity:
20 to 80%RH

Vibration: 10 to 60Hz 0.2m/s^2 or less

Shock: None

Magnetic field: 400 A/m or less

Signal source resistance:
Thermocouple input .... 1kΩ or less
Resistance bulb input... 10Ω/wire or less (resistance of each wire of 3-wire system should be balanced).
Voltage input... 0.1% or less of input resistance

Mounting posture:
Forward tilt 0°, backward tilt within 30°, horizontal 0°

Warm-up time: One hour or more after power ON

Reference standard

Accuracy/resolution:
Measuring conditions (23±2°C, 65±10% RH, power voltage, frequency fluctuation within ±1%, no external noise, warm-up time of 1 hour or more, vertical mounting, standard values of signal source resistance and wiring resistance... within 1%)

Input types		Digital indication accuracy Note 1	Digital indication resolution
Thermocouple	B	± (0.15%+1 digit)	0.1°C
	R		
	S		
	K	±(0.3%+1 digit) for the range shown below Thermocouple B : 400 to 600°C Thermocouples R and S : 0 to 300°C Thermocouples K, E, J, T, L and U : –200 to –100°C	
	E		
	J		
	T		
	N		
	W		
	L		
	U		
	PN		
Resistance bulb	JPt100 Pt100	± (0.15%+1 digit)	0.1°C
DC voltage	50mV	± (0.15%+1 digit)	10μV
	500mV		100μV
	1–5V		1mV
	0–5V		1mV

Note 1) Digital indication accuracy is a percentage (%) of the value in the measuring range.
Note 2) No error of reference contact compensation of thermocouple is included.

Error of reference contact compensation:
K, E, J, T, N, L, U, PN: ±0.5°C
R, S, B, W: ±1.0°C
(when measured at 0°C or more)

Max. input voltage:
Thermocouple, resistance bulb, DC voltage: ±10V DC (continuous)

Input resistance: Thermocouple, DC voltage: About 1MΩ

Others

Clock: With calendar function (Christian era)
Accuracy: ±50 ppm or less (monthly error: about 2 minutes)
However, time error at power ON/OFF is not included.

Memory backup: Parameters are saved to the internal nonvolatile flash memory.
The clock is backed up with built-in lithium battery.
Trend data is not backed up.

Insulation resistance:
100 MΩ (when measured between each terminal and ground by using a 500V DC megger)

Withstand voltage:
Power terminal – ground: 2000V AC, 1 min
Input terminal – ground: 500V AC, 1 min
Alarm terminal – ground: 2000V AC, 1 min
Alarm terminal – alarm terminal:
750V AC, 1 min

Effect on operation

Effect of power supply fluctuation conditions:
For the fluctuation in the range from 90 to 264V AC (frequeucy: 50/60Hz)
Reading change: ±(0.2%+1 digit) or lower.
For the fluctuation in the range from 47 to 63Hz (power voltage: 100V AC)
Reading change: ±(0.2%+1 digit) or lower.

Effect of input signal resistance:
Thermocouple input: 30μV±1 digit per 100Ω
DC voltage: Fluctuation for resistance value equivalent to 0.1% of the input resistance: ±(0.2%+1 digit) or lower.
Reistance bulb (for wiring resistance of 10Ω for 1 line (the same for 3 lines))
Reading change: ±(0.2%+1 digit) or lower.

Effect of ambient temperature:
Reading change: ±(0.3%+1 digit)/10°C or lower.

Effect of Mounting position:
For the backward 30° slant
Reading change: ±(0.2%+1 digit) or lower.

Effect of vibration:
When sine wave of 10 to 60Hz with the acceleration of 0.2m/s^2 is applied in each direction for 2 hours.
Reading change: ±(0.2%+1 digit) or lower.

Safety and EMC standard

Safety standard: Based on IEC61010-1
EMC standard: Based on EN61326

Transportation/storage conditions

Temperature: –10 to +60°C
Humidity: 5 to 90%RH
Vibration: 10 to 60Hz, 0.2m/s^2 or lower
Shock: 294m/s^2 or lower (packed state)

Additional function (option)

■ Alarm relay output/DI (11th digit of code symbols: "1")
A card with 10-point relay output and 5-point DI input can be mounted.
Cannot be mounted if the number of input points is 18.

Terminal structure:
M3 screw terminal

Alarm relay output:
1a contact output (10 points),
Individual channel or common output (OR output) allowed.
DO1: Contact capacity;150V/3A AC, 30V/3A DC (resistance load)
DO2-10: Contact capacity; 240/3A AC, 30V/3A DC (resistance load)

DI input: No-voltage contact input (5 points)
The following control is allowed by contact input.
(1) Recording start/stop
(2) Message set
(3) F value calculation reset
(4) Totalizing start/stop

Support software

The following software is provided as standard.

■ Loader software for PC

Major function: Performs various parameter setting/change of the main unit
O/S: Windows 95/98/2000/XP
Required memory:
64MB or larger
Disk drive: Windows 95/98/2000/XP-capable CD-ROM
Hard disk capacity:
Free capacity of 30MB or larger required
Printer: Windows 95/98/2000/XP-capable printer and printer driver

Note) PC loader communication cable (type PHZP0201) is separately required.

■ Data viewer software

Major function: Regenerates the past trend record on the PC from the data in the compact flash. Provided with historical trend display and event display functions.
O/S: Windows 95/98/2000/XP
Required memory:
64MB or larger
Disk drive: Windows 95/98/2000/XP-capable CD-ROM drive
Hard disk drive: Free capacity of 30MB or larger required
Printer: Windows 95/98/2000/XP-capable printer and printer driver

Standard functions

Function	Description
Record range voluntary setting	Recording range can be set by channel.
Input type setting	Input can be set by channel. (Key operation on the front face) Set the same input type for every 2 channels. See "SELECTING INPUT TYPE" on the last page.
Skip function	Skips arbitrary channel display/recording.
Trend display	Time display: Time is displayed at the top of the trend display screen. Alarm display: On occurrence of an alarm and the restoration, alarm is displayed in the alarm display field. The compact flash usage is displayed at the top of the bargraph.
TAG name display	By channel, Maximum of 8 characters.
Screen name display	Displays the screen name (maximum of 16 characters).
Unit creation	Industrial units can be arbitrarily created, Maximum of 7 digits, 12 types.
Scaling function	Arbitrary scaling is allowed in the case of DC voltage input. Decimal point position can also be arbitrarily set in the range from -32767 to 32767.
PV shift	Shift the zero point and slant of the reading.
Input filter	Prevents sudden fluctuation of input for each channel (primary delay filter). Time constant: 0 to 900 seconds.
Burnout function	Displays the break of thermocouple/resistance bulb input by scaling out to 100% side.
Historical trend display	Regenerates and displays the data stored in the compact flash by scrolling the screen.

Table 1. Recording capacity

If the number of input points is 9, there are no events such as messages, and the data format is ASCII, the recording can be made for the period of time listed in the tables shown below. (When the number of input points is 18, the period is approximately one half of those listed in the table.)
(In binary format, the period is approximately 4 times as long as those listed in the table.)

Compact Flash size	16MB					
Display upgrade cycle	1 sec	10 sec	30 sec	1 min	10 min	30 min
Recordable capacity (about)	28 hours	11 days	35 days	70 days	2 years	5.7 years

CompactFlash size	64MB				
Display upgrade cycle	1 sec	10 sec	30 sec	1 min	10 min
Recordable capacity (about)	112 hours	46 days	140 days	280 days	7.7 years

CompactFlash size	256MB			
Display upgrade cycle	1 sec	10 sec	30 sec	1 min
Recordable capacity(about)	18 days	187 days	1.5 years	3 years

When compact flash is not used, the capacity of the main unit is as follows:
Recorded data: for 400 data, Event data: for 180 data (1 sampling=1 data, irrespective of the number of channels, For 400 seconds at the refresh cycle of 1 second)

ORDERING CODE

Digit	Specifications	Note
4	<Number of input points>	
	9	1
	18	Note 2 2
5	<Mounting>	
	Panel mounting	1
	Portable (desktop)	2
9	<Language (Instruction manual)>	
	Japanese	N
	English	E
11	<Alarm output/DI input>	
	Without	0
	With	Note 1 1

Note 1 : Cannot be selected if 2 is selected for the forth digit (the number of input points is 18).
Note 2 : Cannot be selected if 1 is selected for the 11th digit.

STANDARD ACCESORY

Item		Quantity: Panel mounting	Quantity: Portable
Recorder (PHR)		1	1
Panel mounting bracket		1	—
CD-ROM	PC support software instruction manual (both in English and Japanese)	1	1
Compact flash (16MB)		1	1
Waterproof panel packing for the front face		1	—
Noise filter for the power supply		1	1
AC power cord (2m)		—	1

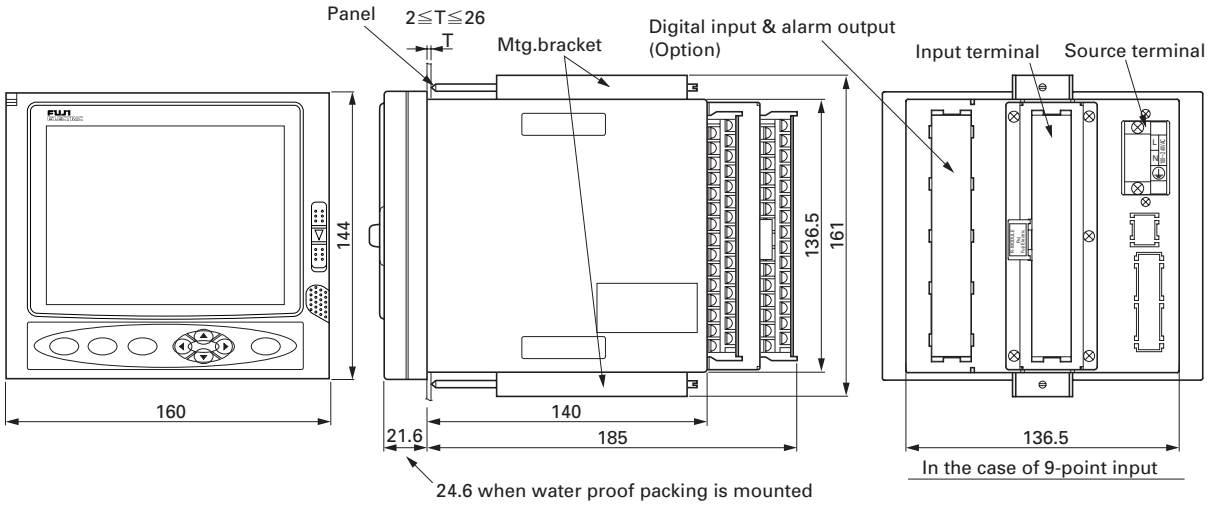
OPTIONAL ITEMS

Item	Code	Specification
Shunt resistor for DC current input	PHZP0101	10Ω ±0.1%
PC loader communication cable	PHZP0201	Length 3m with connector
PC card adapter Manufactured by SanDisk	SDCF-31-03	For compact flash
Compact flash Manufactured by SanDisk	SDCFB-256-801	256MB
	SDCFB-192-801	192MB
	SDCFB-128-801	128MB
	SDCFB-96-801	96MB
	SDCFB-64-801	64MB
	SDCFB-32-801	32MB

OUTLINE DIAGRAMS (Unit : mm)

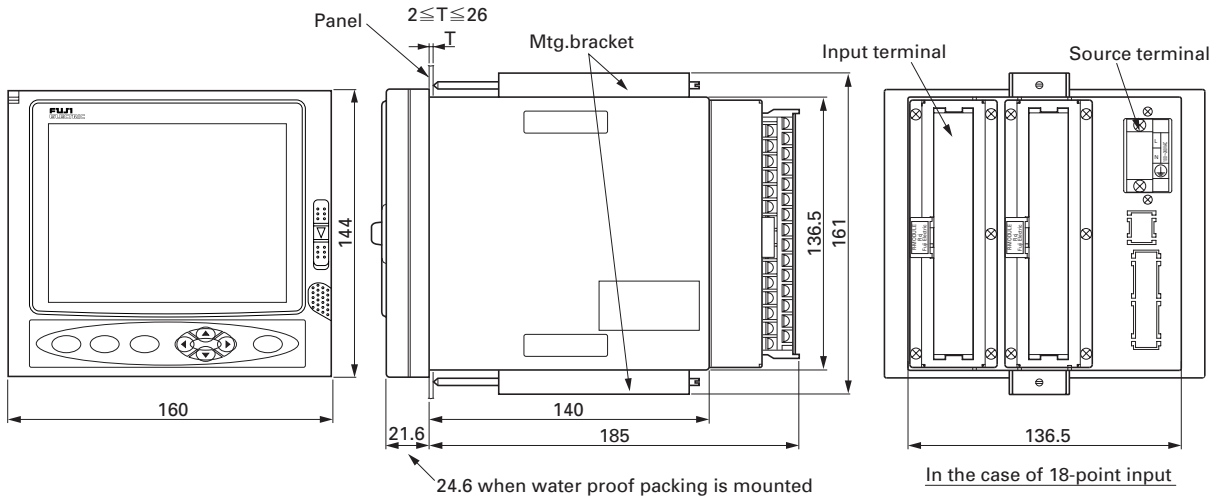
PANEL MOUNTING

In the case of 9-point input



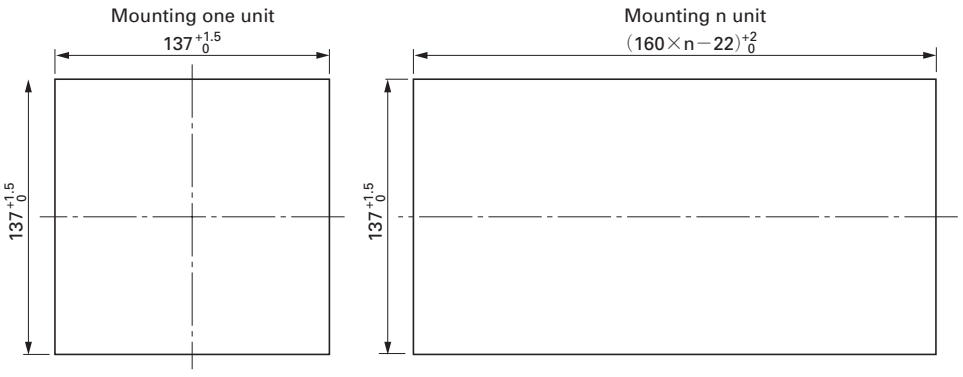
(Note) When placing the main unit on another instrument or on the floor, allow a space of 100mm or more between the unit and instrument or the floor.

In the case of 18-point input



(Note) When placing the main unit on another instrument or on the floor, allow a space of 100mm or more between the unit and instrument or the floor.

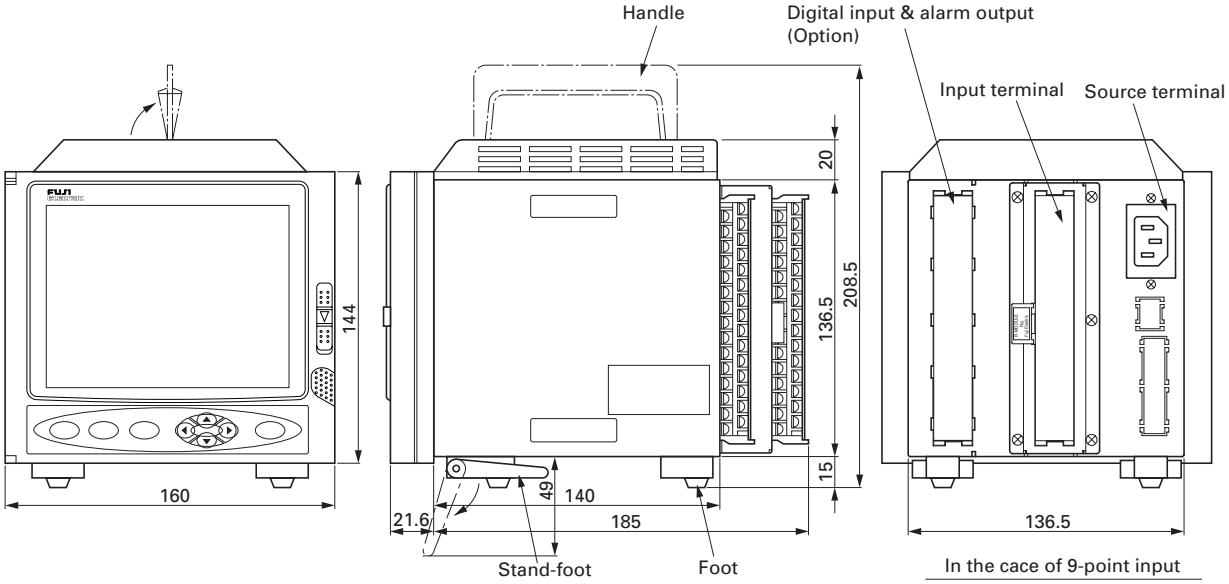
PANEL CUTOUT



Do not use the water proof pacing in case of mounting n unit

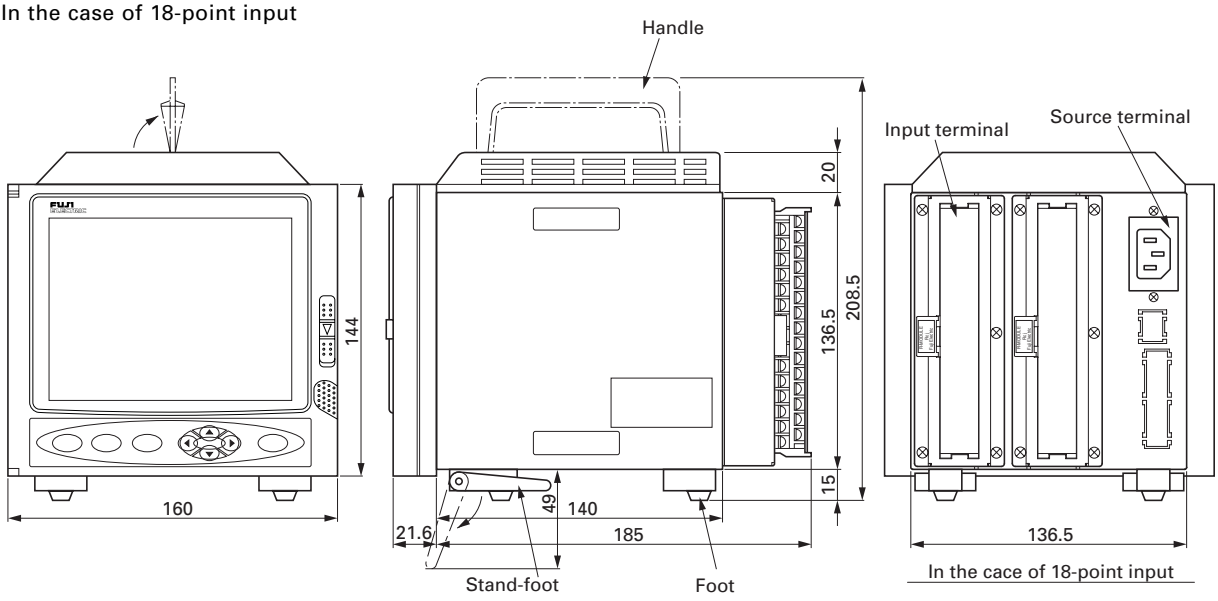
PORTABLE TYPE

In the case of 9-point input



(Note) Please use the stand-foot upright.

In the case of 18-point input

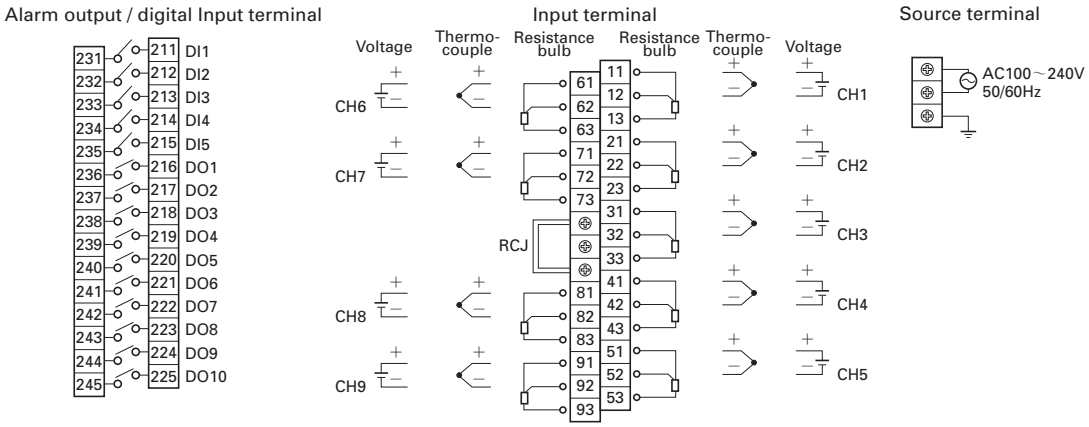


(Note) Please use the stand-foot upright.

EXTERNAL CONNECTION DIAGRAMS (M3 screw)

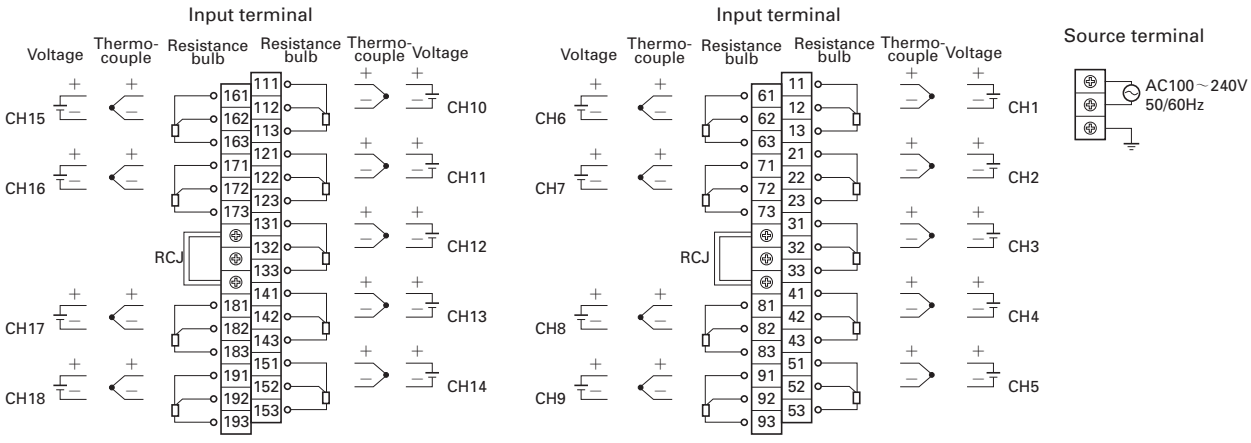
PANEL MOUNTING

In the case of 9-point input



(Note) For current input, connect an optional shunt resistance to a voltage input terminal

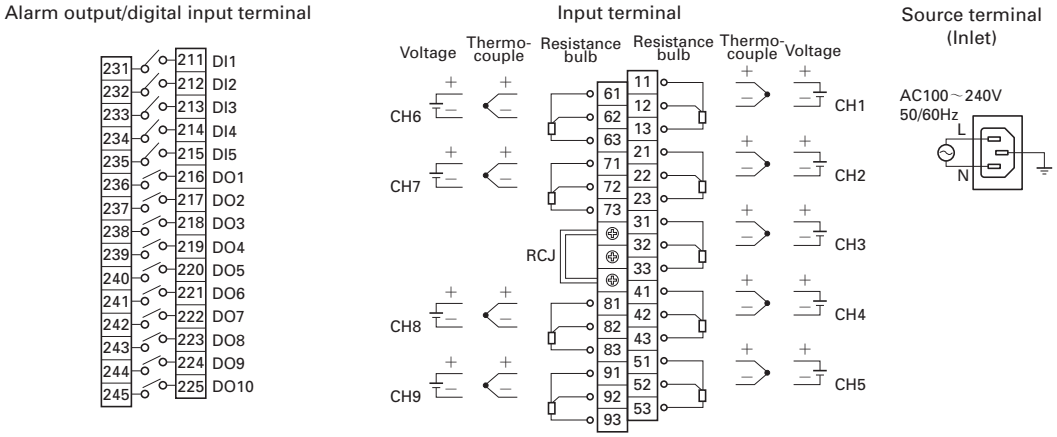
In the case of 18-point input



(Note) For current input, connect an optional shunt resistance to a voltage input terminal

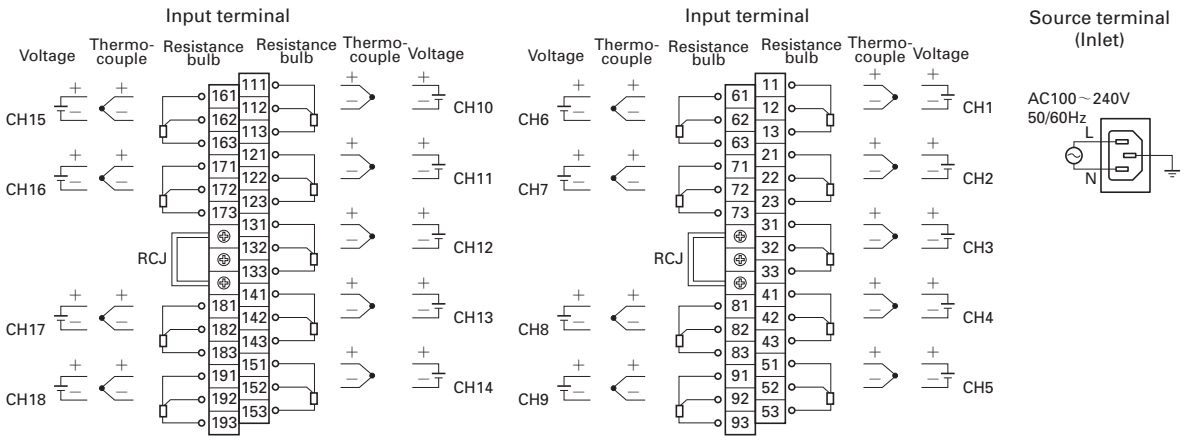
PORTABLE TYPE

In the case of 9-point input



(Note) For current input, connect an optional shunt resistance to a voltage input terminal

In the case of 18-point input



(Note) For current input, connect an optional shunt resistance to a voltage input terminal

SELECTING INPUT TYPE

Basically, the input type can be every 2 channels.
The input type of channel 2, 4, 6, 8, 11, 13, 15 and 17 can only be set in the same category of previous channel.
The following input types are available.

Input type	Details
Thermocouple, 50mV	K, E, J, T, R, S, B, N, W, L, U, and PN thermocouples, 50mV
Resistance bulb	Pt100, JPt100
500mV	500mV
5V	1 to 5V, 0 to 5V

Note, however, that input type can be arbitrarily selected only for channels 9 and 18 irrespective of the type allocated to other channels.

Example of channel input type selection

	Input type	Input type	Description
Channel 1	K thermocouple	Thermocouple, 50mV	The type of thermocouple can be arbitrarily selected for each channel.
Channel 2	T thermocouple		
Channel 3	1-5V	5V	
Channel 4	0-5V		
Channel 5	Pt100	Resistance bulb	The type of resistance bulb can be arbitrarily selected for each channel.
Channel 6	JPt100		
Channel 7	500mV	500mV	
Channel 8	500mV		
Channel 9	J thermocouple	Thermocouple, 50mV	Input type can be arbitrarily selected for channel 9.
Channel 10	K thermocouple	Thermocouple, 50mV	The input type of the thermocouple and 50mV is the same.
Channel 11	50mV		
Channel 12	Skip	5V	Skip can arbitrarily selected irrespective of the input type.
Channel 13	1-5V		
Channel 14	Pt100	Resistance bulb	
Channel 15	Skip		
Channel 16	Skip	500mV	
Channel 17	500mV		
Channel 18	50mV	Thermocouple, 50mV	Input type can be arbitrarily selected for channel 18.

Note 1) Windows 95/98/2000/XP, Excel are the registered trademarks of Microsoft Corporation of the U.S.A.
Note 2) CompactFlash is the registered trademark of Sundisk Corporation.

⚠ Caution on Safety
*Before using this product, be sure to read its instruction manual in advance.

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